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ABSTRACT

Admission to the California State University system is based on an eligibility index (EI) that considers high school grade point average (GPA) and Scholastic Aptitude Test (SAT) or American College Test (ACT) scores. Whether the SAT adds to the accuracy of prediction of college success or is redundant, and whether it is biased against specific subgroups were studied by examining college performance of two freshman cohorts at California State University (Hayward) (CSUH): 762 regularly processed students who completed an academic year's work in one calendar year, and 210 regularly admitted students who took longer to complete an academic year of work (students with slower progress). Age, gender, ethnicity, high school GPA, SAT scores, and freshman GPA were collected for 823 of these students and quantitative college GPA was calculated for the 660 who had taken at least one mathematics or mathematics-related course at CSUH. For regularly admitted students, the addition of the SAT to high school GPA increases the predictability of overall freshman GPA and quantitative GPA a small but significant amount for all gender and ethnic subgroups. For the slower progressing students, prediction is much more difficult using SAT or high school GPA. The present SAT does not appear biased or redundant for regularly progressing students, but better predictors should be sought for college performance in general. Eight tables present study findings. A 23-item list of references is included. (SLD)

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APPROPRIATENESS OF THE SAT IN SELECTING STUDENTS FOR ADMISSION TO CALIFORNIA STATE UNIVERSITY, HAYWARD

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APPROPRIATENESS OF THE SAT IN SELECTING STUDENTS FOR ADMISSION TO CALIFORNIA STATE UNIVERSITY, HAYWARD

BACKGROUND

For many decades, traditional wisdom held that the Scholastic Aptitude Test (SAT) added considerably to the effectiveness of high school performance when used to predict college grade point average. More recently, perhaps in response to a decline in SAT scores which began during the 1960's, many have scrutinized the use of the SAT in college admissions decisions. Criticism has centered on 1) the alleged redundancy of the test, claiming that the SAT adds very little to the prediction of first-year college grades and 2) on the supposed bias of the test, claiming the use of it results in excluding members of certain groups (females, ethnic minorities) whose lower scores cause under-prediction of college success (Bracey, 1980; Nairn and Nader, 1980; Slack and Porter, 1980; Owen, 1985). Such criticism has generated controversy and debate-rebuttals, principally by the Educational Testing Service (ETS) and the College Board, who are responsible for development and administration of the SAT (Anrig, 1985; Dorans and Kulick, 1986; Educational Testing Service, 1980). Aside from test bias, explanations for the lower test scores of some groups have included differential course work (Pallas and Alexander, 1983), language and cultural characteristics (Schmitt, 1988), and coaching of low-income students (Johnson and Wallace, 1989).

Test Redundancy

Examining the question of whether the SAT adds significantly to the prediction of first-year performance, Robert Linn (1982) looked at 827 studies on the predictive value of the SAT and found that the SAT contributed very little (an additional .06 over high school grades) to the multiple correlation with college freshman grade point average (FRGPA). In a series of articles in the Harvard Educational Review in 1985, James Crouse of the University of Delaware and George Hanford, then President of ETS, debated the value of SAT scores in admissions decisions. Crouse agreed that the high school record (grades or class rank) and SAT together are more effective in predicting freshmen grades, but claimed that the SAT adds little to increase the number of correct decisions (those whose freshman performance meets some minimum criteria) over use of high school performance alone. Crouse contended that the SAT is a costly redundancy, but that its usefulness should best be determined on an individual institutional basis. He suggested that each institution should derive its own predictive performance formula based on data from past students, excluding the freshman performance of those who were admitted as exceptions to the high school performance/SAT admissions formula. Hanford stated that admissions decisions, particularly at selective colleges, are made using additional criteria other than the "mechanistic" predictive formula of high school record/SAT. Hanford's position was that SAT scores, when considered separately (Verbal/Math), provided different

information about students' skills and played a "confirming role when they are consistent with information from the high school record." Hanford disagreed with Crouse that the SAT provided redundant information, stating that (again for selective colleges in particular) the use of SAT scores had "a greater differential impact on admissions decisions." Gerald Bracey (1989) surveyed 103 deans and directors of admissions nationwide and found that they felt the case for or against the SAT was overstated: that the SAT was only one of several admissions criteria, and not the most important; that the majority of universities are not very selective at all, and in fact have in recent years been seeking non-traditional students; and that "the fact is, with or without standardized tests, colleges admit whomever they want."

Test Bias

In pursuing the question of SAT test bias Robert Cameron of the College Board (1988) presented data from 685 college participants in the College Board Validity Study Service and concluded that, although females scored lower than males on the SAT, the test was a better predictor of college performance for females than for males. Regarding ethnic differences he found that, using the high school record and SAT scores, college GPA's for Asians and Whites were neither over- or under-predicted, and that Black students' college performance was over-predicted. In an extensive survey of the literature on gender differences in admissions test performances Wilder and Powell (1989) summarized

validity studies correlating SAT scores with freshman grades and generally found SAT scores to be under-predictive for females and over-predictive for males. They also found that test scores for females were more strongly correlated with and more predictive of freshman performance than were scores for males. McCormack and McLeod (1988), controlling for course selection effects (difficulty, grading differences), found no gender bias for grade predictions based on high school performance/SAT, though they reported a small but significant amount of under-prediction for females' overall FRGPA.

In a more general sense some critics point to the large differences in scores on the SAT (i.e., females on the average score 60 points lower than males; Blacks on the average score 100 points lower than Whites) as indicative of test bias resulting in discriminative admissions decisions based on test scores (Willie, 1985; Jacobsen, 1986; Norris, 1989). Charles Willie (1985) cited research indicating that SAT scores are valid predictors of freshman GPA only, not four-year performance, especially for minorities, who show substantial improvement from the first to fourth years' performances. Neill and Medina (1989) questioned the validity of standardized tests, in general, stating that certain characteristics of standardized tests reflect the language, culture or learning styles of socio-economically advantaged Whites and are therefore measures of race, ethnicity and income as well as achievement, ability or skill. Lloyd Bond's (1986) response to such criticism was that inequalities in

high school education, not test bias, are responsible for differential test performance.

The debate, to date, still leaves unresolved the two issues of primary concern in the use of the SAT for admissions decisions: redundancy and bias.

STATEMENT OF THE PROBLEM

Admission to the California State University system is based on an Eligibility Index (EI) that considers both High School Grade Point Average (HSGPA) and SAT (or ACT) scores. Although students whose HSGPA is 3.00 or higher are not required to submit standardized test scores, over 90 percent of students seeking admission to CSUH do so. Additionally, students who do not qualify for admission on the basis of the EI may apply for special admission. At some CSU campuses, where more of the applicants qualify for admission based on the EI than can be admitted, other criteria are also used for admissions decisions. At CSUH, where the applicant pool has not yet strained capacity so as to cause rejection of any who qualify by the EI, the effectiveness of the EI is especially important.

In a report by the Division of Analytical Studies, Office of the Chancellor, California State University (1987) the validity and fairness of the EI were examined. General conclusions were that the EI is a sufficiently valid predictor of performance in the CSU system, justifying its continued use as an admissions criteria, and that it did not disadvantage any particular ethnic

group. In particular the correlation (corrected for restriction of range in the EI) of the EI with freshman GPA for the Hayward campus was .740 (CSU system, r=.649).

Paralleling national controversy, at California State University Hayward (CSUH) there is a division of opinion over the possible bias in the use of the SAT in admissions decisions, especially against women and people of color. Therefore, in accordance with James Crouse's (1985) suggestion to perform institutionally specific validity studies on predictive performance formulas, this study was undertaken to examine the usefulness of the SAT in admitting students to CSUH. The two specific questions which will be addressed are:

1) Does the SAT enhance prediction of freshman GPA when compared to predicting with high school GPA only? i.e. Is the SAT redundant?
2) Does the SAT, when used in conjunction with high school GPA, give rise to a regression equation that over- or under- predicts FRGPA for specific subgroups? i.e. Is the SAT biased?

STUDY POPULATION

In traditional predictive validity admission studies, the criterion variable employed is college grade point average at the end of Freshman year. Because a substantial number of CSUH students do not move on to Sophomore standing at the end of one calendar year, two distinct cohorts were identified for this

study. The first can be considered a regularly progressing group: those students who by virtue of a satisfactory eligibility index were admitted to CSUH as Freshmen in Fall 1988 and who, by Fall 1989, had earned between 30 and 48 quarter units, at least 20 of those at CSUH. 331 students were identified as belonging in this group. This selection procedure was duplicated one year later, identifying an additional group of 431 students. The two year population of 762 regularly progressing students provided a cohort in which ethnic by gender subgroups were large enough for at least some meaningful statistical analyses.

The second group comprised non-traditional (slower) progressors: those students who by virtue of a satisfactory eligibility index were admitted to CSUH as Freshmen in Fall 1988 and who, by Fall 1989, had earned 20-29 quarter units; OR students who were admitted as Freshmen Fall 1987 through Summer 1988 and who, by Fall 1989, had earned 30-48 quarter units. 128 students were so identified. Again, this process was replicated one year later, identifying an additional 82 students for the study. The two year population of slower progressors provided a cohort of 210 students, which was large enough to yield meaningful analysis for gender groups and some ethnic groups, but not large enough for gender by ethnic subgroup analysis.

DESIGN OF THE STUDY

Criterion Variable

Although there are those who would argue that grade point average is not the best choice of a variable for defining success in college, FRGPA is the almost universal choice of a criterion variable when considering which students to admit. Until recently, overall FRGPA was the only consideration. Because apparent gender bias associated with the SAT has been postulated to disappear when considering differential course work (males take more quantitative courses in which grade distribution is lower), a quantitative GPA was calculated in addition to overall FRGPA for each student in the study. The overall GPA was calculated considering all courses taken for baccalaureate credit. Quantitative GPA was calculated from baccalaureate level courses in mathematics, statistics, physics, chemistry, biology, geology, finance, accounting, computer information systems and computer science.

Predictor Variables

Because of the CSU policy of considering only the EI when evaluating students for regular admission, the predictor variables chosen for this study were limited to HSGPA and SAT Verbal and Mathematics scores. Although either American College Test (ACT) or SAT scores may be submitted for admission consideration, very few CSUH students submit only ACT scores; this study included only those students who had taken the SAT.

Descriptive Variables

Information as to age, gender and ethnicity was determined for all students in order to examine the question of bias.

Analysis for Redundancy

For each cohort - both regular progressors and slower progressors - a Pearson product moment coefficient of correlation was calculated between HSGPA and overall FRGPA for all feasible ethnic and gender groups. These correlations may be spuriously low because the EI policy acts to curtail the range of HSGPA's of students required to submit SAT or ACT scores, but it should be remembered that over 90 percent of CSUH freshmen submit standardized test scores. The HSGPA-FRGPA r was compared to the multiple R calculated from the regression of overall FRGPA on HSGPA and SAT Verbal and Mathematics scores. Incremental differences were examined for both statistical and practical significance. These analyses were then repeated using the quantitative GPA as the criterion.

Analysis for Bias

Two regression equations were calculated on the total population from the regular progressor cohort utilizing overall FRGPA as the criterion. The first equation included only HSGPA as the predictor; the second equation included HSGPA and SAT Verbal and Mathematics scores as predictors. Predicted average FRGPA was calculated from each of these overall equations for

various population subgroups. These predicted average GPA's were compared to actual average GPA's and the extent of over- or under-prediction (bias) was determined. This procedure was then repeated with the quantitative GPA as the criterion. The same set of procedures was also carried out with the slower progressing cohort.

RESULTS AND DISCUSSION

Demographic Description

Table 1 shows the gender and ethnic distribution of the two cohorts.

Insert Table 1 about here

The regularly progressing cohort was about 63 percent female and about 55 percent White. Asians comprised 18 percent of the population, Blacks and Hispanics about 7 percent and 8 percent respectively, and other ethnic groups about 11 percent. Females made up a greater proportion of the total in the Black and Hispanic subgroups (about 70 percent) than they did in the Asian and White subgroups (about 60 percent). The age of over 96 percent of the group was 20 years or under, only one percent was over 25. This was true for both males and females.

The slower progressing cohort had a slightly smaller percent of females - 60 percent - and a considerably smaller proportion of Whites and Asians - 43 percent and 15 percent. It had a

somewhat larger percent of Hispanics (11 percent) and a very much larger proportion of Blacks: 18 percent as compared to 7 percent in the regular cohort. For this cohort, 89 percent of the students were 20 years or younger and 4 percent were over 25. Again, the relationship between gender and age was not significant. While the slower cohort was slightly older than the regularly progressing cohort, it did NOT include a noteworthy number of reentry students, either male or female. Reentry students are more often specially admitted without regard to the eligibility index.

Criterion Variable Description

Table 2 presents the means and standard deviations of the overall and quantitative FRGPA's for the various gender and ethnic subgroups.

Insert Table 2 about here

The regularly progressing cohort had an overall CSUH Freshman GPA of 2.70, equivalent to a "B Minus". The overall female FRGPA was only very slightly higher than the mean for males. The White and Hispanic group GPA's were slightly above the overall mean; the Asian GPA was somewhat below the overall mean and the mean FRGPA for Black students was considerably below the overall figure. In all ethnic groups except for Hispanics the mean for females was greater than the mean for males. The

difference between the White gender subgroups was negligible; it was somewhat larger for the Black gender subgroups (.09) and there was a considerable difference between the Asian females and males (.20).

The picture was somewhat different for the quantitative GPA. Here the Asian group mean was slightly above the overall group mean, the White and Hispanic means a negligible amount above the overall mean and the Black quantitative GPA significantly below the overall cohort GPA. Surprisingly (?) the female mean quantitative GPA was at least marginally higher than the male quantitative GPA for all ethnic subgroups except Hispanics. For almost all subgroups the quantitative GPA was a third to a half point below the all course GPA, indicating that either quantitative courses are more difficult or the grading system is more stringent. At least 80 percent of all subgroups except Blacks in the regularly progressing cohort had taken at least one quantitative course. For Blacks, only 57 percent had taken a quantitative course.

The description of FRGPA for the slower progressing cohort presents a picture that is again different. Whereas most of the mean GPA's were about one half point below those for the regularly progressing cohort, the mean male all course GPA was higher than that for females. Asian, White and Hispanic group GPA's were above the overall mean, the Black GPA was below the overall mean. Numbers for the subgroups were too small to describe the gender by ethnic differences.

The reason for the poorer performance of the slower progressing cohort is not immediately obvious. Possibly, these students are less motivated and/or have more pressing out of school commitments which accounts for both their slower progress and poorer grades. Perhaps the women especially have greater family responsibilities.

The mean quantitative GPA for the slower progressing group was a discouraging 1.59: below a "C Minus". Only 69 percent of this cohort had taken even one quantitative course. There was no overall gender difference. While ethnic breakdowns are provided in Table 2 the numbers are too small to allow for confident statements about differences.

Predictor Variable Description

Table 3 shows means and standard deviations for the predictor variables of HSGPA and SAT.

Insert Table 3 about here

For the regularly progressing cohort the average HSGPA was a little above a "B". The female GPA was significantly higher than the average for males. Asian, White and Hispanic means were at or above the overall average, the Black mean was below. For all ethnic groups female average grades were higher than those for males. This is consistent with the gender/ethnic patterns reported in the literature for High School grades. It should be

noted that in all cases the gender differences were larger at the high school level than at the college level.

The overall mean on the Verbal section of the SAT for the regularly progressing cohort was 415. The mean for Whites was above the overall mean; for Hispanics the mean was just below, and for Blacks the mean was considerably below the overall mean. The Asian SAT-Verbal mean was about 362, lowest of all ethnic groups, no doubt reflecting the large number of non-native English speaking Asian students. For all ethnic groups except Blacks, males scored higher than females.

On the Mathematics section of the SAT the mean was higher than it was on the Verbal section - about 475. In this section both Whites and Asians scored above the overall mean; Blacks and Hispanics scored below it. For all ethnic groups males scored higher than females. The difference was negligible between the Hispanic gender subgroups, was about 20 points between Black subgroups, about 40 points between Asian subgroups and about 45 points between White subgroups. Again, the pattern of males out performing females on the SAT is in agreement with literature reports.

Looking at the slower progressing cohort, the male HSGPA is no different from the HSGPA of the regular cohort; this is true for males overall and for White and Non-White males. However, the female GPA for the slower cohort is significantly below the female GPA of the regular cohort.

This same pattern is reflected in SAT scores. Means for the slower cohort White and Non-White males are very close to the corresponding male means of the regular cohort, but females in the slower cohort score much lower than females in the regular cohort, making the slow cohort differences between males and females far more pronounced. Slower cohort females scored an average of 37 points below males on the Verbal section of the SAT and 82 points below males on the SAT-M.

Again, perhaps the women in this cohort had far heavier family responsibilities or were more ambivalent about the need for college preparation.

Test Redundancy

Table 4 shows the correlation of total FRGPA with HSGPA, the multiple correlation of total FRGPA with HSGPA and SAT, and the difference between the correlation coefficients. The table also presents the standard regression weights for the predictor variables, which gives the relative importance of each in predicting FRGPA. Because the numbers for minority ethnic by gender subgroups were too small for regression analyses, only white and non-white subgroups appear in the table.

Insert Table 4 about here

The zero order r relating HSGPA and FRGPA for the regularly progressing cohort was .43; the multiple R including SAT scores

as predictors was increased to .48. That indicates that the proportion of the variance of the FRGPA explained by the predictors increased from 18 percent ($.43^2$) to 23 percent ($.48^2$). Although the increase was statistically significant a very large proportion (77 percent) of the variance is still left unexplained, especially when compared to the 1987 Chancellor reported r of .74. Although a correction for restriction of range could have been applied, close to 85 percent of the entire sample presented SAT scores, and 80 percent of the sample whose HSGPA was 3.00 or higher had taken the SAT. It was thought best, therefore, to report uncorrected r's. Possibly, the lower correlation reported here between HSGPA and FRGPA is due to a decrease in the variability of grades.

The gender and ethnic group correlations between HSGPA and FRGPA ranged from .36 for non-white males to .53 for Hispanics. Whereas for the group overall, females were only slightly more predictable than males, the non-White females were very significantly more predictable (r = .52) than the non-White males (r = .36). It is regrettable that the numbers for specific minority ethnic by gender subgroups were not large enough to provide reliable regression results. The increase of R over r was small but significant for all gender and ethnic groups in the regular cohort except for Blacks, where the increase was not significant. In most groups the SAT contributed an additional .04 to .06 to the correlation coefficient. This finding is in agreement with the results reported by Linn (1982). For all

gender and ethnic groups the HSGPA was the most important contributor to prediction of FRGPA.

The relationships for the slower progressing cohort were even less substantial. Except for total group correlation between FRGPA and HSGPA, there were no relationships that were statistically significant even though all n's were greater than 70. Even for the total group only 3 percent ($.18^2$) of the variance in FRGPA could be accounted for by HSGPA. In no group of the slower progressing cohort did the addition of the SAT scores to HSGPA significantly increase predictability. It must be concluded that for the slower progressing cohort High School grades and standardized test scores are not relevant predictors of college performance. Again, variables such as motivation and financial and family obligations might be more predictive.

Table 5 shows the correlation of quantitative GPA with HSGPA, the multiple correlation of quantitative GPA with HSGPA and SAT, and the difference between the correlation coefficients. The table also presents the standardized regression weights for the predictor variables.

Insert Table 5 about here

The correlation between HSGPA and quantitative FRGPA for the regularly progressing cohort was .31 (r^2 =.10). This is considerably below that for the all course FRGPA. Coefficients

ranged from .19 for white males to .47 for non-white females; all r's were statistically significant. Overall, females were more predictable than males, and non-Whites, primarily Asians, were more predictable than Whites. Adding SAT scores to the regression equation significantly increased the correlation coefficient for all groups in this cohort although the increases were modest; the largest was .10 for both the Asian and Black/Hispanic groups. Again, the HSGPA contributed the most to prediction for almost all groups; the exception was White males where the SAT-Math was the most important predictor. The SAT-Math also weighed heavily when predicting Asian students' quantitative GPA.

The quantitative GPA for the slower progressing cohort was essentially unpredictable from HSGPA or SAT scores. The only significant relationship was between HSGPA and quantitative GPA for non-whites, and there the HSGPA accounted for only 5 percent of criterion variance. The SAT did not significantly increase predictability for any groups in this cohort.

Test Bias

Table 6 shows regression equations constructed from the entire regularly progressing cohort with all course FRGPA as the criterion.

Insert Table 6 about here

The equation using only HSGPA as the predictor was

$$\hat{Y} = .5845\ \text{HSGPA} + .8886$$

When mean predicted FRGPA's were calculated for ethnic and gender groups and then compared to actually achieved mean FRGPA the differences showed a slight over-prediction (bias for) Asian students (.13) and Black students (.12) and a slight under-prediction (bias against) White males (-.12). Considering that the standard deviation for FRGPA was about 0.5, the largest difference was only about one quarter of the standard deviation, not generally considered significant.

When SAT scores were added as a predictor the regression equation was

$$\hat{Y} = .5363\ \text{HSGPA} + .0010\ \text{SATV} + .0005\ \text{SATM} + .3725$$

The addition of SAT scores served to reduce the differences between predicted and actual GPA's to an insignificant amount for all gender and ethnic groups.

Table 7 shows the regression equations and differences between predicted and actual all course FRGPA's for the slower progressing cohort.

Insert Table 7 about here

There was essentially no over- or under-prediction of any ethnic or gender group, i.e. there was no observable bias.

Table 8 shows regression equations for the regularly progressing cohort with quantitative GPA as the criterion.

Insert Table 8 about here

The regression equation for the one predictor model was

$$\hat{Y} = .7426\ HSGPA - .058$$

Male GPA's were somewhat under-predicted (-.11) using this equation, especially non-white males (-.14). However, the standard deviation of the quantitative GPA was about 0.9 so the extent of the under-prediction was relatively small.

When SAT scores were added as predictors the regression equation was

$$\hat{Y} = .6465\ HSGPA + .0004\ SATV + .0023\ SATM - 1.036$$

Again, the SAT serves to reduce the extent of over- and under-prediction; the discrepancy was greatest for non-white males but was still relatively small.

The extent of over- or under-prediction of quantitative GPA for the slower progressing cohort was not calculated since there was no predictability at all using HSGPA or SAT scores.

A word of caution is in order here regarding the interpretation of all results. Correlation coefficients are notoriously unreliable, and numbers in this study were not large enough to permit cross validation; sampling error may be large. THe results presented in this paper, therefore, should not be considered as definitive, but rather as probable.

SUMMARY

Two freshman cohorts at the CSUH campus were identified for study - the first was a group of 762 regularly admitted students who had completed an academic years work (or close to it) in one calendar year. This group was labeled the regularly progressing cohort. The second was a group of 210 regularly admitted students who took one and one half to two calendar years to complete one academic year of work; this was called the slower progressing cohort. The variables of age, gender, ethnicity, HSGPA, SAT Mathematics and Verbal scores, and all course freshman GPA were collected for 823 of these students and quantitative GPA was calculated for the 660 students who had taken at least one mathematics or math related course at CSUH.

Description of the Regularly Progressing Cohort

The group was 63 percent female, 55 percent White, 18 percent Asian, 8 percent Black, 7 percent Hispanic and 11 percent another ethnic group. 96 percent were 20 years or younger in age.

The average HSGPA was 3.10. Asian, White and Hispanic HSGPA's were at or above the cohort average; the Black students' mean was below average. For the overall group as well as all ethnic subgroups, female GPA's were higher those of males.

The average Verbal SAT score was 415. Males out performed females overall, and in all ethnic subgroups except Blacks. The average Mathematics SAT score was 475. Males out performed

females for all ethnic subgroups, although for Hispanics the difference was negligible. White and Asian means were above the overall cohort mean, Black and Hispanic means were below it.

The all course college GPA was "B minus" (2.70). The average GPA for females was very slightly higher than the average for males. White and Hispanic mean freshman GPA's were significantly above Asian and Black means.

The quantitative college GPA was 2.27 for both males and females. Asian, Hispanic and White GPA's were above the overall cohort mean, the Black average was below it.

Description of the Slower Progressing Cohort

This group was 60 percent female, only 43 percent White and 15 percent Asian, but 18 percent Black and 11 percent Hispanic. 89 percent were 20 years or younger in age, 4 percent were 26 or older.

For males, the average HSGPA and SAT scores were almost the same as for the regular progressing cohort, but for females the HSGPA and SAT scores were much below their regular cohort counterparts. Thus for the slower cohort, there was no difference between male and female HSGPA's and very large differences in SAT scores, with males far out performing females in the group overall and also in the White and non-White gender/ethnic subgroups.

When looking at CSUH freshman GPA, subgroups of Whites, Asians, and Hispanics scored at or above the cohort mean while

Blacks scored below it. All subgroups in this cohort had GPA's significantly below their regular cohort counterparts.

Slower progressor performance in quantitative courses was very markedly below the regular cohort: the average quantitative GPA was 1.59 as compared to 2.27. Additionally only 69 percent of the slower cohort had taken any quantitative courses as compared with 83 percent of the regular cohort.

Overall, males in this cohort as compared to those in the regular cohort started at the same level at the end of high school and lost ground in college, while females in this cohort started behind and stayed behind.

The Issue of SAT Redundancy

When total freshman GPA was used as a criterion for regularly progressing students, adding SAT scores to HSGPA increased the correlation coefficient from .43 to .48, a statistically significant but practically small amount. The SAT significantly increased predictability for all gender and ethnic subgroups with the exception of Black students. The incremental increases ranged from .03 to .07.

When quantitative freshman GPA was used as a criterion for regularly progressing students, the overall R was increased by the addition of SAT scores from .31 to .38. The increase was statistically significant for all gender and ethnic subgroups; the median increase was .07.

Freshman grade point averages, overall and quantitative, for the slower progressing cohort were essentially unpredictable from HSGPA and SAT scores.

The Issue of SAT Bias

A regression equation was written for the entire regularly progressing cohort using freshman GPA as the criterion and HSGPA and SAT scores as the predictors. The FRGPA calculated from this overall equation for various ethnic and gender groups was compared to the actual GPA achieved by each of the groups. The difference between achieved and predicted GPA was calculated, giving the extent of over- or under-prediction of FRGPA. The predicted GPA was slightly overestimated for females (.01), Asians (.06) and Blacks (.06) and underestimated for males (-.04), Whites (-.04) and Hispanics (-.07). In no case did the extent of over- or under-prediction approach significance.

When the quantitative freshman GPA was used as the criterion there was similarly no significant over- or under-prediction of GPA for any ethnic or gender subgroup.

CONCLUSIONS

When the Scholastic Aptitude Test is combined with High School Grade Point Average for the purpose of predicting Freshman grade point average, the GPA's predicted from the overall regression equation are not significantly different from the actual GPA's for any gender or ethnic subgroup. This is true whether the criterion is overall FRGPA or quantitative GPA. Therefore it can be concluded that for CSUH regularly admitted students the SAT is an unbiased predictor.

For regularly admitted students completing close to one academic year in one calendar year, the addition of the SAT to HSGPA increases the predictability of overall freshman GPA a small but significant amount for all gender and ethnic subgroups except Black students. It increases the predictability of the quantitative GPA for all subgroups. For the overall group the change in multiple R from .43 to .48 represents a 12 percent increase in predictability of overall freshman GPA. The addition of SAT scores results in a 23 percent increase in predictability of quantitative GPA. This would appear to be a large enough increase to avoid labeling the SAT a redundant predictor. If the present trend of diminishing variability of high school grades continues, the relative importance of the SAT should increase.

Examining the SAT for the slower progressing cohort points up a much larger problem. The FRGPA for this group is essentially unpredictable using the SAT and/or HSGPA.

The fact that one of the examined cohorts is not predictable and the other cohort has a multiple R of less than 0.5 leads to the conclusion that educators need to intensify the search for better predictors of college performance. Because the present SAT is neither biased or redundant does not mean that it is effective. Hopefully the new SAT will continue to be unbiased and will contribute more heavily in the prediction of freshman grades.

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TABLE 1. DESCRIPTION OF THE POPULATION

	REGULAR PROGRESSORS		SLOWER PROGRESSORS	
	N	% of total	N	%
Overall	762	100	210	100
By Gender				
Male	281	37	85	40
Female	481	63	125	60
By Ethnicity				
White	420	55	91	43
Non-White	336	44	116	55
Asian	137	18	32	15
Black	53	7	37	18
Hispanic	59	8	23	11
Other	87	11	24	11
Missing	6	1	3	1
By Gender & Ethnicity				
White Male	166	22	44	21
White Female	254	33	47	22
Non-White Male	115	15	41	20
Non-White Female	221	29	75	36
Asian Male	57	7		
Asian Female	80	10		
Black Male	16	2		
Black Female	37	5		
Hispanic Male	19	2		
Hispanic Female	40	5		
By Age				
Less than 21	731	96	187	89
21-25	19	2	15	7
26 or older	9	1	8	4
Missing	3	<1		

TABLE 2. CRITERION VARIABLES FOR DESCRIPTOR GROUPS

	OVERALL FRGPA			QUANTITATIVE GPA		
	N	Mean	SD	N	Mean	SD
REGULAR PROGRESSORS						
Overall	762	2.70	0.50	634	2.27	0.90
By Gender						
Male	281	2.67	0.48	239	2.27	0.93
Female	481	2.71	0.51	395	2.27	0.88
By Ethnicity						
White	420	2.76	0.50	353	2.29	0.91
Non-white	336	2.62	0.50	275	2.24	0.90
Asian	137	2.62	0.51	123	2.33	0.91
Black	53	2.52	0.46	30	1.97	0.87
Hispanic	59	2.73	0.47	47	2.29	0.91
Other/Missing	93			81		
By Gender & Ethnicity						
White Male	166	2.74	0.48	143	2.27	0.92
White Female	254	2.77	0.51	210	2.31	0.90
Non-white Male	115	2.57	0.46	96	2.27	0.95
Non-white Female	221	2.64	0.51	179	2.23	0.87
Asian Male	57	2.50	0.53	53	2.24	1.00
Asian Female	80	2.70	0.48	70	2.40	0.84
Black Male	16	2.46	0.39	12	1.93	1.07
Black Female	37	2.55	0.49	18	1.99	0.74
Hispanic Male	19	2.82	0.37	13	2.63	0.73
Hispanic Female	40	2.69	0.50	34	2.15	0.94
SLOWER PROGRESSORS						
Overall	210	2.20	0.58	145	1.59	0.94
By Gender						
Male	85	2.24	0.60	70	1.58	1.03
Female	125	2.18	0.57	75	1.59	0.85
By Ethnicity						
White	91	2.27	0.66	68	1.53	0.98
Non-white	116	2.14	0.51	75	1.62	0.92
Asian	32	2.23	0.49	22	1.63	0.89
Black	37	2.03	0.42	21	1.60	0.81
Hispanic	23	2.23	0.55	16	1.69	1.22
Other/Missing	27			18		
By Gender & Ethnicity						
White Male	44	2.22	0.62	34	1.45	0.99
White Female	47	2.31	0.71	34	1.61	0.97
Non-white Male	41	2.25	0.59	36	1.71	1.07
Non-white Female	75	2.08	0.45	39	1.53	0.76

TABLE 3. PREDICTOR VARIABLES FOR DESCRIPTOR GROUPS

	HSGPA			SCHOLASTIC APTITUDE TEST				
				VERBAL			MATHEMATICS	
	N	Mean	SD	N	Mean	SD	Mean	SD
REGULAR PROGRESSORS								
Overall	753	3.10	0.37	643	414.55	85.22	474.89	83.97
By Gender								
Male	280	2.99	0.36	244	419.39	87.89	499.80	81.91
Female	473	3.16	0.36	399	411.59	83.52	459.67	81.63
By Ethnicity								
White	417	3.11	0.36	356	437.96	77.93	488.90	75.95
Non-white	331	3.08	0.38	283	384.91	85.42	457.46	90.66
Asian	132	3.14	0.40	112	361.88	94.66	478.30	97.52
Black	53	2.93	0.27	46	390.22	63.68	419.78	73.95
Hispanic	59	3.11	0.42	52	410.58	82.88	457.69	83.84
Other/Missing	101			77				
By Gender & Ethnicity								
White Male	165	3.02	0.36	141	443.33	81.48	515.53	69.94
White Female	252	3.17	0.35	215	434.44	75.49	471.43	74.80
Non-white Male	115	2.94	0.37	103	386.60	86.09	478.25	91.98
Non-white Female	216	3.16	0.36	180	383.94	85.26	445.56	87.96
Asian Male	57	2.99	0.40	51	366.08	94.93	500.20	98.44
Asian Female	75	3.25	0.37	61	358.36	95.08	460.00	93.65
Black Male	16	2.78	0.24	14	368.57	69.16	434.29	80.74
Black Female	37	2.99	0.27	32	399.69	59.81	413.44	71.19
Hispanic Male	19	2.89	0.37	18	430.56	67.52	458.89	79.70
Hispanic Female	40	3.21	0.41	34	400.00	89.07	457.06	87.13
SLOWER PROGRESSORS								
Overall	210	3.00	0.33	181	389.78	96.08	440.77	95.88
By Gender								
Male	85	2.99	0.33	73	411.92	93.34	489.73	99.36
Female	125	3.00	0.33	108	374.82	95.43	407.69	77.98
By Ethnicity								
White	91	3.04	0.33	71	435.21	93.10	480.56	88.51
Non-white	116	2.96	0.32	108	358.06	84.97	414.63	92.57
Asian	32	2.97	0.34	29	312.76	84.38	428.62	90.27
Black	37	2.92	0.32	36	360.00	74.80	385.83	87.09
Hispanic	23	3.00	0.38	21	381.91	86.18	439.05	99.19
Other/Missing	27			24				
By Gender & Ethnicity								
White Male	44	3.04	0.31	35	443.71	93.62	515.14	95.07
White Female	47	3.04	0.36	36	426.94	93.16	446.94	67.31
Non-white Male	41	2.94	0.34	38	382.63	84.04	466.32	98.65
Non-white Female	75	2.97	0.31	70	344.71	83.04	386.59	76.16

TABLE 4. CORRELATION COEFFICIENTS AND REGRESSION WEIGHTS

CRITERION--TOTAL FRGPA

	Total N	SAT w/ HSGPA N	r_{HS}	R_{HS+SAT}	Increase*	Standard Regression Wts. HSGPA	SATV	SATM
REGULAR PROGRESSORS								
Overall	762	642	.43*	.48	.05	.393*	.173*	.084*
By Gender								
Male	281	243	.42*	.47	.05	.376*	.192*	.064
Female	481	399	.45*	.49	.04	.411*	.166*	.066
By Ethnicity								
White	420	355	.40*	.44	.04	.378*	.156*	.026
Non-White	336	283	.46*	.52	.06	.425*	.138*	.144*
Asian	137	112	.49*	.55	.06	.445*	.068	.217*
Black	53	46	.39*	.41	ns	.411*	-.124	-.031
Hispanic	59	52	.53*	.60	.07	.505*	.303*	-.024
By Gender & Ethnicity								
White Male	166	140	.44*	.47	.03	.402*	.180*	-.008
White Female	254	215	.40*	.43	.03	.385*	.144*	.002
Non-white Male	115	103	.36*	.42	.06	.334*	.120	.141
Non-white Female	221	180	.52*	.57	.05	.468*	.141*	.127
SLOWER PROGRESSORS								
Overall	210	181	.18*	.21	ns	.193*	.120	-.021
By Gender								
Male	85	73	.20	.24	ns	.203	.113	.026
Female	125	108	.17	.21	ns	.183	.139	-.120
By Ethnicity								
White	91	71	.23	.29	ns	.173	.257	-.047
Non-white	116	108	.19	.19	ns	.180	-.045	-.015

* significant, $p<.05$

TABLE 5. CORRELATION COEFFICIENTS AND REGRESSION WEIGHTS

CRITERION--QUANTITATIVE GPA

	Total N	SAT w/ HSGPA N	r_{HS}	R_{HS+SAT}	Increase*	Standard Regression Wts. HSGPA	SATV	SATM
Overall	634	536	.31*	.38	.07	.271*	.037	.211*
By Gender								
Male	239	205	.28*	.34	.06	.225*	.038	.193*
Female	395	331	.36*	.42	.06	.311*	.042	.191*
By Ethnicity								
White	353	299	.23*	.31	.08	.193*	.060	.172*
Non-White	275	233	.41*	.49	.08	.366*	.021	.258*
Asian	123	101	.42*	.52	.10	.375*	-.084	.341*
Black/Hispanic	77	68	.33*	.43	.10	.302*	.194	.123
By Gender & Ethnicity								
White Male	143	120	.19*	.28	.08	.136	.007	.208*
White Female	210	179	.27*	.34	.07	.224*	.114	.122
Non-white Male	416	85	.40*	.48	.08	.366*	.169	.146
Non-white Female	179	148	.47*	.53	.06	.427*	-.059	.267*
SLOWER PROGRESSORS								
Overall	145	124	.10	.14	ns	.098	.051	.062
By Gender								
Male	70	60	.18	.21	ns	.071	.078	.142
Female	75	64	.12	.13	ns	.131	.064	-.073
By Ethnicity								
White	68	53	.20	.24	ns	.203	.123	.024
Non-white	116	108	.22*	.22	ns	.208*	-.057	.012

* significant, $p<.05$

TABLE 6. MEAN PREDICTED GPA AND MEAN ACTUAL GPA
CRITERION--TOTAL FRGPA
REGULAR PROGRESSORS

	N	Mean Predicted $\hat{Y}$	Mean Actual Y	($\hat{Y}$-Y) Difference
PREDICTOR: HSGPA REGRESSION EQUATION: $\hat{Y}$ = .5845 HSGPA + .8886				
Overall	642	2.69	2.69	
By Gender				
Male	243	2.62	2.67	-.05
Female	399	2.73	2.69	.04
By Ethnicity				
White	355	2.69	2.75	-.06
Non-white	283	2.68	2.60	.08
Asian	112	2.70	2.57	.13
Black	46	2.60	2.48	.12
Hispanic	52	2.70	2.74	-.04
By Gender & Ethnicity				
White Male	140	2.64	2.76	-.12
White Female	215	2.73	2.74	-.01
Non-white Male	103	2.59	2.56	.03
Non-white Female	180	2.73	2.63	.10
PREDICTOR: HSGPA & SAT Verbal and Mathematics REGRESSION EQUATION: $\hat{Y}$ = .5363 HSGPA + .0010 SATV + .0005 SATM + .3725				
Overall	642	2.68	2.68	
By Gender				
Male	243	2.63	2.67	-.04
Female	399	2.70	2.69	.01
By Ethnicity				
White	355	2.71	2.75	-.04
Non-white	283	2.63	2.60	.03
Asian	112	2.63	2.57	.06
Black	46	2.54	2.48	.06
Hispanic	52	2.67	2.74	-.07
By Gender & Ethnicity				
White Male	140	2.68	2.76	-.08
White Female	215	2.73	2.74	-.01
Non-white Male	103	2.56	2.56	.00
Non-white Female	180	2.67	2.63	.04

TABLE 7. MEAN PREDICTED GPA AND MEAN ACTUAL GPA
CRITERION--TOTAL FRGPA
SLOWER PROGRESSORS

	N	Mean Predicted $\hat{Y}$	Mean Actual Y	($\hat{Y}$-Y) Difference
PREDICTOR: HSGPA REGRESSION EQUATION: $\hat{Y}$ = .3288 HSPGA + 1.188				
Overall	181	2.16	2.16	
By Gender				
Male	73	2.17	2.21	-.04
Female	108	2.16	2.13	.03
By Ethnicity				
White	71	2.17	2.23	-.06
Non-white	108	2.16	2.12	.04
PREDICTOR: HSGPA & SAT Verbal and Mathematics REGRESSION EQUATION: $\hat{Y}$ = .3487 HSPGA + .0007 SATV - .0001 SATM + .9109				
Overall	181	2.17	2.16	
By Gender				
Male	73	2.19	2.21	-.02
Female	108	2.16	2.13	.03
By Ethnicity				
White	71	2.21	2.23	-.02
Non-white	108	2.15	2.12	.03

TABLE 8. MEAN PREDICTED GPA AND MEAN ACTUAL GPA
CRITERION--QUANTITATIVE GPA
REGULAR PROGRESSORS

	N	Mean Predicted $\hat{Y}$	Mean Actual Y	($\hat{Y}$-Y) Difference
PREDICTOR: HSGPA REGRESSION EQUATION: $\hat{Y}$ = .7426 HSGPA - .058				
Overall	536	2.23	2.23	
By Gender				
Male	205	2.15	2.26	-.11
Female	331	2.28	2.21	.07
By Ethnicity				
White	299	2.24	2.26	-.02
Non-white	233	2.22	2.19	.03
Asian	101	2.25	2.23	.02
Blacks/Hispanic	68	2.18	2.17	.01
By Gender & Ethnicity				
White Male	120	2.17	2.26	-.09
White Female	179	2.29	2.26	.03
Non-white Male	85	2.12	2.26	-.14
Non-white Female	148	2.28	2.16	.12
PREDICTOR: HSGPA & SAT Verbal and Mathematics REGRESSION EQUATION: $\hat{Y}$ = .6465 HSGPA + .0004 SATV + .0023 SATM - 1.036				
Overall	536	2.23	2.23	
By Gender				
Male	205	2.22	2.26	-.04
Female	331	2.24	2.21	.03
By Ethnicity				
White	299	2.28	2.26	.02
Non-white	233	2.18	2.19	-.01
Asian	101	2.24	2.23	.01
Blacks/Hispanic	68	2.12	2.17	-.05
By Gender & Ethnicity				
White Male	120	2.28	2.26	.02
White Female	179	2.28	2.26	.02
Non-white Male	85	2.13	2.26	-.13
Non-white Female	148	2.21	2.16	.05